ising new methods of ranging by sound and observation, and by his force of character Keeling was particularly successful in gaining the confidence of the artillery in these methods, and it would be difficult to over-estimate the effect on many operations which he thus exercised. He was present at the Somme battle, the attack on Cambrai, the great German attack in 1918, and the subsequent British advance.

Keeling returned to Egypt in April, 1919, as head of the Survey of Egypt, having also been appointed chairman of the newly formed Board of Cotton Research, and with his accustomed zeal had already started to develop geodetic and other lines of work in the Department. He was a man of unbounded energy, who combined foresight and skill in administration with a sound scientific training, and his loss is a serious one to Egypt. He had only recently been married, and the sympathies of all are with his widow.

H. G. LYONS.

NOTES.

A CONFERENCE of delegates representing the Mediterranean nations is about to meet at Madrid to organise an international scheme of fishery investigations and to set up a central office for the co-ordination of the results and their publication in French, Spanish, Italian, and English. Four exploring ships are to be at the disposal of the office—the *Hirondelle II.* belonging to the Prince of Monaco, a specially built Italian ship, and two other vessels provided by France and Spain. In the meantime, while the full scheme is being elaborated, the Italian Government is beginning investigations in the Dardanelles. In the main, the object of the researches will be the development of the sea-fishing industries, and the results primarily sought will relate to the life-histories of edible fishes. Hydrographic work will also be carried out. Several big expeditions have made investigations of this nature in the past, but there is still much to be discovered, and sustained research is, of course, imperative in the study of variability of the productivity of the fisheries.

WE note with great regret that Mr. S. D. Chalmers died on Friday, November 7. Born at Wallsend, near Newcastle, New South Wales, Mr. Chalmers had a brilliant career at the University of Sydney, whence a travelling fellowship took him to Cambridge. There he graduated as thirteenth Wrangler in a very strong year. After holding lecturerships in mathematics at Owens College, Manchester, and at the Royal Naval College, Greenwich, he became the first head of the newly organised department of technical optics at the Northampton Polytechnic Institute at Clerkenwell, a post which he held until his premature death at the age of forty-two. Since 1903 Mr. Chalmers's work had been entirely devoted to optics, and his activities were largely identified with the Optical Society of London, of which he was for a time honorary secretary, and in 1909–10 president; and also with the two Optical Conventions of 1905 and 1912. His published work, his teaching, and his personal advice and example have done much for the optical industry of this country, and it is greatly to be regretted that one of the ablest workers in this field has been lost to us at a time when that industry needs all its strength. During the war Mr. Chalmers not only assisted the industry by personal advice and help, and by a large amount of responsible testing work, but he also organised and supervised a special training workshop in which girls were trained to become skilled grinders and polishers of lenses. There can be no doubt that his untimely death is to be ascribed to the excessive strain of these activities, followed by the further strain arising from a combination of a pressure of many students and an inadequacy of staff.

ALL those interested in the afforestation question in this country, and cognisant of the vital economic and social problems bound up with it, will have been relieved at the answer given by Mr. Bonar Law, in reply to Sir Philip Magnus, on the subject of the Commissioners to be appointed under the Forestry Act. It will be remembered that the Forestry Bill was passed by the House of Commons in August last, having been previously accepted by the House of Lords. The Act provided for the appointment of a Central Forestry Commission, consisting of eight Commissioners who should be responsible for the forest policy in Great Britain and Ireland, and anxiety as to the non-appointment of the Commissioners was being felt. The names of the eight Commissioners were announced in last week's NATURE. The member of the Commission who has had a technical and scientific forestry training is Mr. R. L. Robinson, the Cabinet having accepted the principle that at least one Commissioner should possess a scientific training in forestry. We should like to have seen a representative of the purely scientific side of forestry upon the Commission, and also a second expert member possessing a practical and wide knowledge of forestry conditions throughout the British Empire and other parts of the world outside western continental Europe. The advice such a member could tender on many points of vital importance in connection with the afforesting of the great waste areas in this country would prove invaluable. This is a weak spot in the Commission, a disability which, it may be hoped, will be quickly realised by such a broad-minded, energetic, and capable administrator as the chairman, Lord Lovat, has already proved himself to be. In other respects the selection of the Commissioners gives every promise of assuring the fulfilment of the desired results.

WE much regret to record the death, on November 14, at eighty years of age, of Dr. John Aitken, F.R.S., a frequent contributor to our correspondence columns, and distinguished for his lifelong researches on the nuclei of cloudy condensation and related subjects of meteorological physics.

THE ninety-fourth course of juvenile lectures founded by Faraday at the Royal Institution will be delivered this Christmas by Prof. W. H. Bragg on "The World of Sound."

ANNOUNCEMENT is made in the *Times* that Prof. M. Planck, Berlin University, and Prof. H. Stark, Griefswald University, have been respectively awarded the 1918 and 1919 Nobel prizes for physics, and Prof. F. Haber, Berlin University, the 1918 Nobel prize for chemistry.

PROF. WM. BERRYMAN SCOTT, president of the American Philosophical Society, sends us the following congratulatory message from Princeton:—"I am very glad to congratulate you, officially, upon the completion of the first half-century of NATURE's career, to express the cordial wish and hope that that career may long continue in ever-increasing honour and usefulness, and to give some appreciation of the very great services which the journal has rendered to scientific men throughout the world, especially to those of the English-speaking lands."

THE second annual general meeting of the British Association of Chemists was held on November 15 in Manchester, Prof. J. W. Hinchley, the president, presiding. The council is giving much thought to the important question of the representation of chemists and technical workers generally on the joint industrial councils formed under the Whitley scheme, and was able to report that, as a result of the labours of its special sub-committee, a federation of scientific and technical organisations has been formed for the purpose of advancing the claims of brain-workers to representation alongside capital and labour.

APPLICATIONS are invited by St. Bartholomew's Hospital Medical School for election to the Rose research fellowship, which is of the yearly value of 600*l*., exclusive of laboratory expenses. The subject of the research is "The Pathology and Treatment of Lymphadenoma." The person appointed must devote the whole of his time to the fellowship. Applications, with not more than three testimonials, the names of three referees, and particulars of the lines upon which the applicant's proposed research is to be carried out, must reach the Dean of the school not later than December 15 next.

THE retirement of Mr. George A. Macmillan from the honorary secretaryship of the Society for the Promotion of Hellenic Studies should not be allowed to pass without notice in these columns. It was on Mr. Macmillan's initiative, due to the enthusiasm for Greek art and archæology kindled by a visit as a young man to Greece, that the society was founded forty years ago, and during those forty years he has acted as its secretary and been the mainspring of its activities. He has worked in close partnership with all the leading Greek archæologists of this generation, encouraged numberless young men, and afforded generous financial assistance to many enterprises. He is a shining example of one who, having put his hand to a task, does not weary in well-doing, but carries it on through the working years of a lifetime. Even now Mr. Macmillan is not wholly withdrawing from the work of the society, for in vacating the secretaryship he has accepted the honorary treasurership, and his counsel will still be available for the cause for which he has done so much.

BARON ROLAND VON EÖTVÖS, Hungary's greatest man of science, died on April 8 last in Budapest. The son of the Hungarian writer and politician, Baron Josef von Eötvös, he was born at Buda on July 27, 1848. He began his university career at the University of Budapest, and continued his studies under Kirchhoff, Helmholtz, and Bunsen at the University of Heidelberg. He also spent a short time at Königsberg under Franz Neumann. Having obtained the degree of doctor of philosophy at Heidelberg, von Eötvös became a *Dozent* in physics at Budapest University, and in 1872 he was elected to the chair of theoretical physics at that university. Some years later he was also elected to the chair in experimental physics, and for a short period was Minister of Education in Hungary. Von Eötvös occupied the position of president of the Hungarian Academy of Science for many years, and in 1891 he founded the Hungarian Mathematical and Physical Society, the presidency of which he held until his death. He was also the Hungarian representative of the International Commission for earth measurement.

THE Hunterian Society celebrated its centenary on November 12 by a dinner at the Trocadero Restaurant. Dr. Langdon Brown, the president, was in the chair, and Sir Norman Moore (the president of the Royal College of Physicians), Dr. Addison, Sir George Newman, Sir Archibald Garrod, and Sir Frank Dyson (the Astronomer Royal) were among the guests. The society's annual silver medal was presented to Mr. John Adams for his work in connection with the Corporation of London's Thavies Inn clinic for the treatment of expectant mothers and their infants affected by syphilis. The Hunterian Society was founded in 1819 by Sir Thomas Blizard, an admirer of the Hunters, and especially of John Hunter, and has numbered among its presidents Dr. Bright (from whom Bright's disease derives its name), John Hilton (the surgeon), Hughlings Jackson, and Sir Thomas Crosby (a former Lord Mayor). In earlier days consultants resided mostly within the City boundaries, and the society has always kept in touch with the City of London, and resolved to make to Mr. Adams a special centenary award of its medal.

THE British Cotton Industry Research Association was formed some months ago to promote scientific research in connection with the cotton industry, in co-operation with the scheme of the Government Department of Scientific and Industrial Research. The first problem before the association after its incorporation was to secure the services of a man of the highest attainments, who would be able not only to undertake the direction of the association's researches, but also in the difficult initial stages to construct sound foundations for the building up of the institute of the future. As mentioned last week, the council has made this appointment, and by securing the services of Dr. A. W. Crossley, C.M.G., F.R.S., Daniel professor of chemistry at King's College, London, as director of research, the association is making a very fortunate and promising start. In his new post Dr. Crossley will be responsible to the council for the direction of all the research and for the whole internal management of the institution. It will probably not be possible for him to devote his whole time to the work before Easter, but he will no doubt be able to give the association preliminary assistance before then.

THE President of the Board of Agriculture and Fisheries (Lord Lee of Fareham) has now approved of the reorganisation of the Board and the regrouping of its functions into five main Departments, each under an executive head responsible, in the case of the three Agricultural Departments, to the President direct, and in the case of the Fisheries and Welsh Departments to the President through the Parliamentary Secretary (Sir A. Griffith-Boscawen, M.P.). Sir A. Griffith-Boscawen, in addition to his duties as Parliamentary Secretary, has been appointed Deputy-Minister of Fisheries. The following appointments have also been made:—Sir A. Daniel Hall, Chief Scientific Adviser to the Board and Director-General of the Intelligence Department; Mr. Lawrence Weaver, Chief Commercial Adviser to the Board and Director-General of the Land and Supplies Department; Mr. F. L. C. Floud, General Secretary to the Board and Director-General of the Finance and Economics Department; Mr. H. G. Maurice, Fisheries Secretary and Principal Assistant Secretary to the Board; and Mr. C. Bryner Jones, Welsh Secretary, in special charge of the Welsh Office. Mr. R. J. Thompson and Mr. H. L. French have been appointed Assistant Secretaries to the Board to fill the vacancies created by the promotions of Mr. F. L. C. Floud and Mr. H. G. Maurice.

In continuation of the excellent work left unfinished by the late Major Bendire on the life-histories of North American birds, there has recently been issued by the United States National Museum (Bulletin 107, Washington: Government Printing Office) an instalment devoted to the Nearctic diving birds of the order Pygopodes, prepared by Mr. Arthur Cleveland Bent with the co-operation of numerous well-known ornithologists. This volume affords much valuable and up-to-date information relating to the courtship, nesting, eggs, period of incubation, young, plumages, food, behaviour, breeding range, winter range, migrations, egg-dates, etc., of thirty-six species, one-third of which are members of the British avifauna. Among the mass of important and interesting information afforded only a few items can be referred to. It may be mentioned that the comparatively little known large-billed puffin, the haunts of which are confined to a limited portion of the Arctic Ocean, has recently greatly increased in numbers on the north-west coast of Greenland, which is regarded as being the westerly limit of its range. Welcome particulars are given relating to the life-history of the yellow-billed loon or Adam's diver, the eggs and nest of which are figured. There is also an excellent summarised history of the extinct great auk, and a figure of the egg, now in America, which was formerly in the collection of the late Sir William Milner, Bart. The author is to be congratulated on the able manner in which he has presented the results of his studies of the extensive and valuable material at his disposal, and also on the interesting series of pictures of bird-life, about eighty in number, from photographs taken direct from Nature. The volume is further enriched by thirteen coloured plates of eggs.

Messrs. Macmillan and Co., Ltd., have in preparation a "Dictionary of Applied Physics," to be issued probably in four volumes, under the editorship of Sir Richard Glazebrook, who will have the assistance of a number of distinguished contributors. The work is intended to include the range of physical science in its application to engineering and manufacture; it will cover, therefore, a wide ground, and needs the co-operation of many writers. It should appeal to many workers, for the fact that scientific investigation and inquiry form the foundations of new methods of manufacture and are required before any marked advance is possible is now very fully realised. It is hoped, in the various sections of the Dictionary, not only to supply up-to-date information as to what has been done in the past, but also to give some indication of pioneering directions for further progress. The present is a suitable time for such a work; new industries are springing up, old industries are being reconstructed, and there are few which do not involve some process or processes based on the discoveries of physics. Pure science, as the president of the Royal Society stated some little time back, may cause a revolution in an industry. It will be the object of the Dictionary to indicate in a concise form the application of the most recent advances of physics to trade and manufacture.

We have received a catalogue of X-ray and electro-medical apparatus from Messrs. Watson and Sons, Ltd., comprising 369 pages, well illustrated. The whole range of appliances, radiological and electrical, now in use for therapeutic and diagnostic purposes is covered, together with numerous parts of apparatus suitable for research purposes. Prominent among the latter are high-tension transformers which the modern investigations in radio-metallurgy have demanded. Useful information is also to be found in these pages as to the careful use and appropriate technique of many of the appliances, as witness the remarks upon intensifying screens and the management of the various types of Coolidge tubes now available. A considerable section is devoted to stereoscopy; fluoroscopic examinations embodying stereoscopic vision are now possible with comparatively little addition to the installations generally found in a hospital department.

Mr. Roger T. Smith gave his presidential address to the Institution of Electrical Engineers on November 13. As the railways of this country are shortly to be subjected to fresh legislation, the choice of a railway electrical engineer as president was a happy one. Mr. Smith considered the question of superseding the steam locomotive by the electric locomotive both for passenger and goods services. The coal necessary to produce a given hauling effect on the railway by means of an electric locomotive is at the most 40 per cent. of the coal burnt in the furnace of a steam locomotive to produce the same result. This would mean a saving of between 7,000,000 and 8,000,000 tons of coal each year. It has been estimated that to electrify all the railways in Great Britain would cost 300,000,000*l*. If coal ever rose to 45*s*. per ton, the saving of fuel would itself pay 5 per cent. on the investment. The average cost of running a locomotive in 1913 was 1240*l*., the cost of coal and water being about 37 per cent. of the total cost. The average capital cost of a steam locomotive this year is 7000*l*., but the average cost of an electric locomotive, including electric equipment of line, but exclusive of power-house and high-tension lines, would be about 35,000*l*. Mr. Smith calculated that to enable the electric train to earn the present revenue per train-mile, the passenger electric train would have to weigh more than half as much again as the steam train, and the electric goods train would have to be at least 1000 tons in weight, which is much heavier than the average steam train for goods. He considered only main-line electrification, and he admitted that some of his data are controversial. He emphasised the importance of standardisation in main-line electrification, and, judging from our present knowledge, he suggested that the direct-current system, working at 1500, or possibly 3000, volts, would be the most economical for use over the whole country. The problem is of the greatest national importance. In the future the demand for scientifically trained traction engineers will be very great.

The annual report of Lloyd's Register of Shipping for the year ending June 30 last is discussed in the *Engineer* for October 31. During the year 1251 vessels of 3,801,221 tons gross were classified by the committee, including 294 vessels for Government service. The United States headed the list with 470 vessels of 1,883,759 tons. Included in the total were 156 vessels of 943,487 tons built upon the Isherwood system of longitudinal framing, of which 35 were intended for carrying oil-fuel in bulk. It is of interest to note that, owing to the difficulty of obtaining a sufficient number of cylindrical boilers, the greater portion of the vessels built in America and all the wood vessels built in Canada during the war were fitted with water-tube boilers. Also a large proportion of the vessels built in America were fitted with geared turbines, most of them being of the double-reduction type. Besides their ordinary work, the surveyors rendered great assistance to the Admiralty in the design, construction, and production of special types of vessels, and also to the French Government in the inspection of shell steel, of which 1,401,114 tons were passed by the society's surveyors. More than 200 German vessels taken over under the peace terms have been surveyed by the committee's surveyors. The collective capacity of new cold stores and extensions carried out under Lloyd's survey amounts to 7,500,000 cub. ft. The committee has also undertaken research work at its own expense, one of the subjects at present engaging the attention of the special sub-committee on research being the effect of a fluid cargo in the form of oil in bulk on the behaviour of a ship in a seaway, and the manner in which energy passes between the ship and the fluid in the holds. The report is voluminous, and it is only possible to touch upon a few of the leading items of interest.

THE new monthly *Conquest,* of which the first number has just been issued, will fill a want long felt by the British public for a magazine giving, in popular language, an account of the scientific and technical achievements of the day. Readers having a technical bent were obliged to glean what information they could from the technical journals proper, or, if they read French sufficiently well, to subscribe to a well-known French periodical which fulfils the same function. The first number contains well-written and illustrated articles on the running of the London tubes, the technique of film-making, the internal structure of metals (by Dr. Walter Rosenhain), and other interesting contributions.

The Cambridge University Press hopes to have vol. iii. of the "Cambridge British Flora" ready for publication before the end of the year. Other announcements of the same publishers are a new edition of Prof. A. H. Keane's "Man, Past and Present," completely revised and largely rewritten by Mrs. Quiggin, with the assistance of Dr. A. C. Haddon; "Pleasure—Unpleasure," an experimental investigation on the feeling-elements, Dr. A. Wohlgemuth; "Chemistry for Textile Students," Prof. B. North and N. Bland; "Machine Drawing for Electrical Engineers," E. Blythe; "Food Poisoning and Food Infections," Dr. W. G. Savage; "Practical Exercises on the Weather and Climate of the British Isles," W. F. Stacey; "The Physiology of Farm Animals, Part i. (General)," Dr. F. H. A. Marshall; "General Psychology," W. S. Hunter; "Practical Geometry," C. Godfrey and A. W. Siddons; and "The Elements of Analytical Conics," Dr. C. Davison. *The Library Press, Ltd.,* has nearly ready for inclusion in its Manufacturing Problem Series "The Management Problem," E. T. Elbourne, and in preparation "The Reorganisation Problem," J. E. Powell, and "The Workers' Problem," W. Wilkinson. *The S.P.C.K.* will publish "Woodcraft Scouting in Town and Suburb," the Rev. W. Bren ("Silver Wolf").

A CATALOGUE (No. 78) interesting not only by reason of its contents, but also from the fact that many of the volumes offered for sale are from the libraries of the late Prof. T. McKenny Hughes and Mr. W. E. Balston, and that the geological portion of the library of Dr. Henry Woodward is included, has just been circulated by Messrs. Dulau and Co., Ltd., 34–36 Margaret Street, W.1. The 1018 works listed range over the subjects of zoology, botany and horticulture, geology and palæontology, astronomy, physics, etc., geography and travel. Many scarce books are on sale, but the majority of the volumes offered are obtainable for reasonable prices.

READERS of NATURE on the look-out for bargains in books for personal use or for presents would do well to see the Catalogue (No. 183) just issued by Messrs. W. Heffer and Sons, Ltd., Cambridge. All the works listed are new copies, and the reductions in price from those at which they were originally published are in many cases remarkable. Most branches of literature are represented, and many well-known books of science of comparatively recent publication are included.

MR. F. EDWARDS, 83 High Street, Marylebone, W.1, has just published an illustrated Catalogue (No. 395) of valuable early English and foreign books. The sections most likely to appeal to readers of NATURE are those referring to works dealing with Africa, America, Medicine, Herbals, Husbandry, and Natural History.

THE Society of Glass Technology should have been included in the list of scientific societies founded in the last fifty years given in the jubilee issue of NATURE. The society was founded in November, 1916, and has 550 members. Its work has frequently received favourable notice in our columns.

OUR ASTRONOMICAL COLUMN.

LARGE FIREBALL.—On November 2, at 7.6 p.m., a fireball of considerable brilliancy was seen by Mr. C. P. Adamson, of Wimborne, Dorset. Its observed flight was from $40^\circ+7^\circ$ to $51^\circ+4^\circ$, and it had an extremely slow motion, its visible duration being carefully estimated as five seconds. The nucleus left a short train behind it.

The same object was observed by Dr. Cowper at Shanklin, Isle of Wight. The meteor was comparable with a football in regard to apparent size and shape. It fell in due east in a nearly vertical direction.

From these details it is not possible to deduce exact values for the height, etc., and further observations are required. Probably the radiant was at $312^\circ+14^\circ$; and the height, 56 to 29 miles; path, 39 miles; and velocity, 10 miles. The object was over France in the region 45 miles east of Boulogne.

COMETS.—Mr. Sassaki, of Kyoto, Japan, discovered a comet on October 25 in R.A. 20h. 17m. 20s., south declination 27° 11′, the G.M.T. being October 24d. 23h. It was reobserved on November 9 by M. Schaumasse at the Nice Observatory, and was then found to be identical with Finlay's periodic comet, for which the Nice Observatory had already published a search ephemeris. As the comet's period is close to 6½ years, it is well placed every thirteen years, and usually escapes observation at the intervening return. On November 11 it approached the earth within some 15,000,000 miles, its apparent magnitude being 9·0. The following is an ephemeris for Greenwich midnight:—

		R.A.			N. Decl.		Log r	Log Δ
		h.	m.	s.	°	′		
Nov.	21 ...	0	35	0	5	15	0·0606	9·3149
	25 ...	1	4	20	9	24	0·0713	9·3657
	29 ...	1	28	4	12	38	0·0818	9·4166
Dec.	3 ...	1	48	4	15	7	0·0920	9·4658
	7 ...	2	6	12	17	1	0·1020	9·5140

The following is a continuation of the ephemeris of Schaumasse's periodic comet 1911 VII. for Greenwich midnight. The magnitude is about 12·5:—

		R.A.			N. Decl.		Log r	Log Δ
		h.	m.	s.	°	′		
Nov.	19 ...	13	15	41	2	32	0·1081	0·2671
	23 ...	13	28	47	1	28		
	27 ...	13	41	30	0	26	0·1198	0·2710
					S. Decl.			
Dec.	1 ...	13	53	51	0	34		
	5 ...	14	5	49	1	32	0·1329	0·2745

The above ephemerides do not claim great accuracy, and some sweeping may be necessary to find the comets.